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10/002,381	10/31/2001	Richard P. Tarquini	10017556-1	2797

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EXAMINER	
TRUONG, CAM Y T	
ART UNIT	**PAPER NUMBER**
2162	

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	10/002,381	TARQUINI, RICHARD P.	
	Examiner	Art Unit	
	Cam Y T. Truong	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant has amended claims 1, 8, 11, and 18 and canceled claim 7 can in the amendment filed on 1/17/2006. Claims 1-6, 8-20 are pending in this Office Action.

Response to Arguments

2. Applicant's arguments with respect to claims 1-6, 8-10, 18-20 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that Gillam does not teach the added claimed limitation "each one of said plurality of root nodes comprising a hash value for the first character represented by said respective root node".

In response: this claimed limitation is addressed in paragraph 7.

Applicant argued that Gillam does not teach the claimed limitation "determining a hash value for a target signature; determining a branch having a root node of said lexical search tree data structure corresponding to said hash value".

In response, Gillam teaches the claimed limitations:

"determining a branch having a root node of said lexical search tree data structure corresponding to said hash value" as determining a branch, which contains three nodes N, O, W, is associated with a root node Root of lexical search tree as shown in fig. 1. This branch is not associated with hash value.

"determining a hash value for a target signature" as comparing first letter of the word to the letter in the root node. The word is presented as a target signature. This 'word ' is not determined a has value (fig. 2, col. 28-31);

Gillam does not explicitly teach the claimed limitation "hash value".

Chang teaches assigning a hash value to each characters such a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 (col. 8, lines 10-15; col. 6, lines 24-30).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Chang's teaching of assigning a hash value to each characters such a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 to Gillam's system in order to search characters or records in a hierarchy data structure more effieciently by testing a properly formed node signature than by comparing field values in the records.

Applicant argued that Gillam does not teach "determining a hash value for a signature".

In response: Uppala teaches each node of plurality of root nodes includes a hash value for each node character (figs. 6, 7A, col. 6, lines 35-51).

Applicant argued that the amended claims get over 101 rejection.

In response: Examiner still maintains 101 rejection because Claims 1-10 recite "a lexical search tree data structure". However, the claimed data structure does not define structural and functional interrelationships between the data structure and the computer

software and hardware components which permit the data structure's functionality to be realized. Thus, claims 1-10 are merely abstract idea whereby "at least one branch linked to at least one of said plurality of root nodes, each branch with the root node to which it is linked represented at least one of a plurality of signatures" is being processed without any links to a practical result in the technology arts and without computer manipulation.

Claim 11 recites "a method for search a plurality of signatures stored in a lexical search tree data structure". However, the claim fails to contain a tangible result. Thus, claim 11 is merely abstract idea whereby "traversing only said branch to find a match between said at least one signature and said target signature " is being processed without any links to a practical result in the technology arts and without computer manipulation.

Claims 12-17 recite "the method". However, the claims fail to contain contain a tangible result. Thus, claims 12-17 are merely abstract idea and are being processed without any links to a practical result in the technology arts and without computer manipulation.

For the above reason, examiner believed that rejection of the last office action was proper.

Claim Objections

3. Claim 1 is objected to because of the following informalities: the limitation "said respective root node" should be written as "respective root node" in page 2, lines 8-9. Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-17 are rejected under 35 U.S.C.101 because the language of the claim raises a question as to whether the claim is directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practice application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C 101.

As regarding to:

Claim 1 recites "a lexical search tree data structure". However, the claimed data structure does not define structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized. Thus, claim 1 is merely abstract idea whereby "at least one branch linked to at least one of said plurality of root nodes, each branch with the root node to which it is linked represented at least one of a plurality of

signatures" is being processed without any links to a practical result in the technology arts and without computer manipulation.

Claims 2-10 recite "the lexical search tree data structure". However, the claimed data structure does not define structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized. Thus, claims 2-10 are merely abstract idea and are being processed without any links to a practical result in the technology arts and without computer manipulation.

Claim 11 recites "a method for search a plurality of signatures stored in a lexical search tree data structure". However, the claim fails to contain a tangible result. Thus, claim 11 is merely abstract idea whereby "traversing only said branch to find a match between said at least one signature and said target signature " is being processed without any links to a practical result in the technology arts and without computer manipulation.

Claims 12-17 recite "the method". However, the claims fail to contain contain a tangible result. Thus, claims 12-17 are merely abstract idea and are being processed without any links to a practical result in the technology arts and without computer manipulation.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-6, 8-12, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable Gillam (US 6470347) in view of Uppala (US 6279007).

As to claim 1, Gillam teaches the claimed limitations:

"a plurality of linked root nodes" as a plurality of linked root nodes such as C, A, F O (fig. 1, col. 2, lines 1-10);

"at least one branch linked to at least one of said plurality of root nodes" as a branch includes two nodes M, E linked to root node O (fig. 1, col. 2, lines 10-15);

"each branch along with the root node to which it is linked representing at least one of a plurality of signatures" as the trie in fig. 1 stores the characters in the phrases 'Now is the time for all good men to come the aid of their country', each child of the root node has the first character in each word of the phrase. For example, a branch, which includes Six nodes, C U, N, T, R, Y along with a Root node which it is linked representing as Country of a plurality words in a phrase. Each word in this phrase is represented as a signature (fig. 1, col. 2, lines 1-15);

"and each branch having one or more leaf nodes linked hierarchically to one another, each leaf node representing a character in a signature" as a branch such as MEN having two leaf nodes linked hierarchically to another, each leaf node presenting a character, i.e., node E represents a E character (fig. 1, col. 2, lines 1-10);

"a first character of each signature being represented by one of said plurality of root nodes" as a first character N of a signature 'Now' being represented by the first root node N. A first character I of a signature 'is' being represented by the second root node I (fig. 1, col. 2, lines 1-30).

Gillam does not explicitly teach the claimed limitation "each one of said plurality of root nodes comprising a hash value for the first character represented by said respective root node".

Uppala teaches each node of plurality of root nodes includes a hash value for each node character (figs. 6, 7A, col. 6, lines 35-51).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Uppala's teaching of each node of plurality of root nodes includes a hash value for each node character to Gillam's system in order to permit rapid insertion of new data into the data structure when new hierarchical values are stored in the data store and further to increase speed of searching nodes in a tree quickly.

As to claim 2, Gillam teaches the claimed limitation "a twig linked to one of said leaf nodes and representing a substring of a second signature of said plurality of

signatures, said second signature having at least the same first character as said first signature and said first and second signatures diverging from one another at said leaf node to which said twig is linked" as (fig 1, col. 1, lines 10-15).

As to claim 3, Gillam teaches the claimed limitations:

" a twig node representing a first character of said substring, said twig node being at the same level as said leaf node to which said twig is linked; and one or more leaf nodes, each leaf node representing a character of said substring" as (figs. 1-2; col. 1, lines 30-40).

As to claim 4, Gillaim teaches the claimed limitation "wherein each of said plurality of signatures comprises a string of characters" as (fig 1, col. 1-10).

As to claim 5, Gillam teaches the claimed limitation "wherein the number of said root nodes is equal to the number of characters in a character set available to represent said plurality of signatures" as (figs. 1-2).

As to claim 6, Gillam teaches the claimed limitation "the set of ASCII characters" as (col. 5, lines 33-50).

As to claim 8, Gillam teaches the claimed limitation "a pointer to a leaf node of said one or more leaf nodes if a first character of any of said plurality of signatures corresponds to said root node" as (col. 2, lines 30-45).

As to claim 9, Gillam teaches the claimed limitation "each leaf node having only one other leaf node directly linked to it at the next lower level" as (fig. 2).

As to claim 10, Gillam teaches that "a plurality of twigs linked to one of said leaf nodes, each twig of said plurality of twigs representing a substring of a different signature of said plurality of signatures" as (figs. 1-2).

As to claim 11, Gillam teaches the claimed limitations:

"determining a branch having a root node of said lexical search tree data structure corresponding to said hash value" as determining a branch, which contains three nodes N, O, W, is associated with a root node Root of lexical search tree as shown in fig. 1. This branch is not associated with hash value.

"determining a hash value for a target signature" as comparing first letter of the word to the letter in the root node. The word is presented as a target signature. This 'word ' is not determined a has value (fig. 2, col. 28-31);

"said branch along with said root node representing at least one signature of said plurality of signatures" as a branch along with root N on the left side of the tree represented as a signature 'Now' (fig. 1, col. 1, lines 1-10);

"said branch having one or more leaf nodes linked hierarchically to one another" as a branch along with root node N of the left side of the tree has a leaf node O, which is linked to another leaf node W (fig. 1, col. 1, lines 1-15);

"each leaf node representing an element of said at least one signature" as each leaf node representing an character as a element of a word 'now' as a signature (fig. 1, col. 1, lines 1-15);

"and traversing only said branch to find a match between said at least one signature and said target signature" as comparing first letter of the word to the letter in the root node. The word is presented as a target signature. The above information shows that the system traverses only branch to find a match between a word in a branch of the tree and the word in a phrase. The word is presented as a target signature (fig. 2, col. 28-45).

Gillam does not explicitly teach the claimed limitation "hash value".

Uppala teaches each node of plurality of root nodes includes a hash value for each node character (figs. 6, 7A, col. 6, lines 35-51).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Uppala's teaching of each node of plurality of root nodes includes a hash value for each node character to Gillam's system in order to permit rapid insertion of new data into the data structure when new hierarchical values are stored in the data store and further to increase speed of searching nodes in a tree quickly.

As to claim 12, Gillam teaches the claimed limitation "determining a first element of said target signature" as (fig. 1).

Gillam does not explicitly teach the claimed limitation "determining a hash value for said first element". Uppala teaches each node of plurality of root nodes includes a hash value for each node character (figs. 6, 7A, col. 6, lines 35-51).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Uppala's teaching of each node of plurality of root nodes includes a hash value for each node character to Gillam's system in order to permit rapid insertion of new data into the data structure when new hierarchical values are stored in the data store and further to increase speed of searching nodes in a tree quickly.

As to claim 14, Gillam teaches the claimed limitation "comparing successive elements of said target signature with successive elements of said at least one signature stored in successive leaf nodes of said one or more leaf nodes so long as said successive elements of said target signature match said successive elements of said at least one signature" as (col. 1, lines 10-45).

As to claim 15, Gillam teaches the claimed limitation "determining a twig associated with said branch at a point of divergence between said at least one signature and said target signature, said twig representing a terminating substring of a second

signature of said plurality of signatures; and traversing said twig to find a match between a terminating substring of said target signature and said terminating substring represented by said twig" as (col. 1, lines 10-45).

As to claim 16, Gillam teaches the claimed limitation "comparing successive elements of said terminating substring of said target signature with successive elements of said terminating substring of said second signature represented by said twig so long as said successive elements match" as (col. 1, lines 10-45).

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillam in view of Uppala and further in view of Kadashevich (US 5319779).

As to claim 13, Chang does not explicitly teach the claimed limitation "said hash value being the ASCII code for said first element". Kadashevich sum of the values in ASCII code (mod a) of each character in the suffix (col. 21, lines 13-15).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Kadashevich's teaching of sum of the values in ASCII code (mod a) of each character in the suffix (col. 21, lines 13-15) to Gillam's system in order to generate a index containing the subset of words.

9. Claims 1-6, 8-12, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillam in view of Chang et al (or hereinafter "Chang") (US 5319779).

As to claim 1, Gillam teaches the claimed limitations:

"a plurality of linked root nodes" as a plurality of linked root nodes such as C, A, F O (fig. 1, col. 2, lines 1-10);

"at least one branch linked to at least one of said plurality of root nodes" as a branch includes two nodes M, E linked to root node O (fig. 1, col. 2, lines 10-15);

"each branch along with the root node to which it is linked representing at least one of a plurality of signatures" as the trie in fig. 1 stores the characters in the phrases 'Now is the time for all good men to come the aid of their country', each child of the root node has the first character in each word of the phrase. For example, a branch, which includes Six nodes, C U, N, T, R, Y along with a Root node which it is linked representing as Country of a plurality words in a phrase. Each word in this phrase is represented as a signature (fig. 1, col. 2, lines 1-15);

"and each branch having one or more leaf nodes linked hierarchically to one another, each leaf node representing a character in a signature" as a branch such as MEN having two leaf nodes linked hierarchically to another, each leaf node presenting a character, i.e., node E represents a E character (fig. 1, col. 2, lines 1-10);

"a first character of each signature being represented by one of said plurality of root nodes" as a first character N of a signature 'Now' being represented by the first root node N. A first character I of a signature 'is' being represented by the second root node I (fig. 1, col. 2, lines 1-30).

Gillam does not explicitly teach the claimed limitation "each one of said plurality of root nodes comprising a hash value for the first character represented by said respective root node". Chang teaches assigning a hash value to each characters such

a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 (col. 8, lines 10-15; col. 6, lines 24-30).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Chang's teaching of assigning a hash value to each characters such a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 to Gillam's system in order to search characters or records in a hierarchy data structure more effieciently by testing a properly formed node signature than by comparing field values in the records and further to permit rapid insertion of new data into the data structure when new hierarchical values are stored in the data store and further to increase speed of searching nodes in a tree quickly.

As to claim 2, Gillam teaches the claimed limitation "a twig linked to one of said leaf nodes and representing a substring of a second signature of said plurality of signatures, said second signature having at least the same first character as said first signature and said first and second signatures diverging from one another at said leaf node to which said twig is linked" as (fig 1, col. 1, lines 10-15).

As to claim 3, Gillam teaches the claimed limitations:

" a twig node representing a first character of said substring, said twig node being at the same level as said leaf node to which said twig is linked; and one or more leaf nodes, each leaf node representing a character of said substring" as (figs. 1-2; col. 1, lines 30-40).

As to claim 4, Gillaim teaches the claimed limitation "wherein each of said plurality of signatures comprises a string of characters" as (fig 1, col. 1-10).

As to claim 5, Gillam teaches the claimed limitation "wherein the number of said root nodes is equal to the number of characters in a character set available to represent said plurality of signatures" as (figs. 1-2).

As to claim 6, Gillam teaches the claimed limitation "the set of ASCII characters" as (col. 5, lines 33-50).

As to claim 8, Gillam teaches the claimed limitation "a pointer to a leaf node of said one or more leaf nodes if a first character of any of said plurality of signatures corresponds to said root node" as (col. 2, lines 30-45).

As to claim 9, Gillam teaches the claimed limitation "each leaf node having only one other leaf node directly linked to it at the next lower level" as (fig. 2).

As to claim 10, Gillam teaches that "a plurality of twigs linked to one of said leaf nodes, each twig of said plurality of twigs representing a substring of a different signature of said plurality of signatures" as (figs. 1-2).

As to claim 11, Gillam teaches the claimed limitations:

"determining a branch having a root node of said lexical search tree data structure corresponding to said hash value" as determining a branch, which contains three nodes N, O, W, is associated with a root node Root of lexical search tree as shown in fig. 1. This branch is not associated with hash value.

"determining a hash value for a target signature" as comparing first letter of the word to the letter in the root node. The word is presented as a target signature. This 'word ' is not determined a has value (fig. 2, col. 28-31);

"said branch along with said root node representing at least one signature of said plurality of signatures" as a branch along with root N on the left side of the tree represented as a signature 'Now' (fig. 1, col. 1, lines 1-10);

"said branch having one or more leaf nodes linked hierarchically to one another" as a branch along with root node N of the left side of the tree has a leaf node O, which is linked to another leaf node W (fig. 1, col. 1, lines 1-15);

"each leaf node representing an element of said at least one signature" as each leaf node representing an character as a element of a word 'now' as a signature (fig. 1, col. 1, lines 1-15);

"and traversing only said branch to find a match between said at least one signature and said target signature" as comparing first letter of the word to the letter in the root node. The word is presented as a target signature. The above information shows that the system traverses only branch to find a match between a word in a branch of the tree and the word in a phrase. The word is presented as a target signature (fig. 2, col. 28-45).

Gillam does not explicitly teach the claimed limitation "hash value".

Chang teaches assigning a hash value to each characters such a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 (col. 8, lines 10-15; col. 6, lines 24-30).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Chang's teaching of assigning a hash value to each characters such a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 to Gillam's system in order to search characters or records in a hierarchy data structure more effieciently by testing a properly formed node signature than by comparing field values in the records.

As to claim 12, Gillam teaches the claimed limitation "determining a first element of said target signature" as (fig. 1).

Gillam does not explicitly teach the claimed limitation "determining a hash value for said first element". Chang teaches assigning a hash value to each characters such a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 (col. 8, lines 10-15; col. 6, lines 24-30).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Chang's teaching of assigning a hash value to each characters such a=0, b=1, c=2 and providing a means to encode a substring of a record field or text word into a single numeric value with a specified range. The number computed by the hash function identifies a bit position in the leaf signature S1 which is to be set to 1 to Gillam's system in order to search characters or records in a hierarchy data structure more efficiently by testing a properly formed node signature than by comparing field values in the records.

As to claim 14, Chang teaches the claimed limitation "comparing successive elements of said target signature with successive elements of said at least one signature stored in successive leaf nodes of said one or more leaf nodes so long as said successive elements of said target signature match said successive elements of said at least one signature" as (col. 1, lines 10-45).

As to claim 15, Gillam teaches the claimed limitation "determining a twig associated with said branch at a point of divergence between said at least one signature and said target signature, said twig representing a terminating substring of a second signature of said plurality of signatures; and traversing said twig to find a match between a terminating substring of said target signature and said terminating substring represented by said twig" as (col. 1, lines 10-45).

As to claim 16, Gillam teaches the claimed limitation "comparing successive elements of said terminating substring of said target signature with successive elements of said terminating substring of said second signature represented by said twig so long as said successive elements match" as (col. 1, lines 10-45).

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillam in view of Chang and further in view of Kadashevich (US 5319779).

As to claim 13, Chang does not explicitly teach the claimed limitation "said hash value being the ASCII code for said first element". Kadashevich sum of the values in ASCII code (mod a) of each character in the suffix (col. 21, lines 13-15).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Kadashevich's teaching of sum of the values in ASCII code (mod a) of each character in the suffix (col. 21, lines 13-15) to Chang's system in order to generate a index containing the subset of words.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillam in view of Chang et al (or hereinafter "Chang") (US 5319779) and further in view of Hayashi (US 5841376).

As to claim 17, Gillam teaches the claimed limitations:

"setting a current node pointer to point to a leaf node of said one or more leaf nodes" as (col. 1, lines 10-45);

"updating said current node pointer to point to a leaf node following said next leaf node" as (fig. 1, col. 1, lines 10-45).

Gillam does not explicitly teach the claimed limitation "setting a target signature pointer to point to an element of said target signature as in response to a value of said leaf node pointed to by said current node pointer being equal to a wild card character and a value of the element pointed to by said target signature pointer being equal to a value of the next leaf node following the leaf node pointed to by said current node pointer".

Hayashi teaches a search for a coincidence character string is performed by using a character string registered in an entry indicated by the ID. At step 404, sptr is obtained by referencing the dictionary 100 based on the ID value. sptr is identical with a pointer ptr of the character string stored in the entry of the dictionary 100 indicated by the ID. At step 405, character strings indicated by sptr and dptr are read from the data memory 104, and compared with each other. The number of characters over which a

match has been found by the compared is made a coincidence length. Upon completion of step 405, the process returns to step 402 to repeat steps 402-405. This loop is continued until a termination symbol NIL appears (col. 9, lines 30-46).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Hayashi's teaching of a search for a coincidence character string is performed by using a character string registered in an entry indicated by the ID. At step 404, sptr is obtained by referencing the dictionary 100 based on the ID value. sptr is identical with a pointer ptr of the character string stored in the entry of the dictionary 100 indicated by the ID. At step 405, character strings indicated by sptr and dptr are read from the data memory 104, and compare with each other. The number of characters over which a match has been found by the comparison is made a coincidence length. Upon completion of step 405, the process returns to step 402 to repeat steps 402-405 to Gillam's system in order to update or insert a character in a tree correctly.

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillam in view of Uppala and further in view of Hayashi (US 5841376).

As to claim 17, Gillam teaches the claimed limitations:

"setting a current node pointer to point to a leaf node of said one or more leaf nodes" as (col. 1, lines 10-45);

"updating said current node pointer to point to a leaf node following said next leaf node" as (fig. 1, col. 1, lines 10-45).

Gillam does not explicitly teach the claimed limitation "setting a target signature pointer to point to an element of said target signature as in response to a value of said leaf node pointed to by said current node pointer being equal to a wild card character and a value of the element pointed to by said target signature pointer being equal to a value of the next leaf node following the leaf node pointed to by said current node pointer".

Hayashi teaches a search for a coincidence character string is performed by using a character string registered in an entry indicated by the ID. At step 404, sptr is obtained by referencing the dictionary 100 based on the ID value. sptr is identical with a pointer ptr of the character string stored in the entry of the dictionary 100 indicated by the ID. At step 405, character strings indicated by sptr and dptr are read from the data memory 104, and compared with each other. The number of characters over which a match has been found by the compared is made a coincidence length. Upon completion of step 405, the process returns to step 402 to repeat steps 402-405. This loop is continued until a termination symbol NIL appears (col. 9, lines 30-46).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Hayashi's teaching of a search for a coincidence character string is performed by using a character string registered in an entry indicated by the ID. At step 404, sptr is obtained by referencing the dictionary 100 based on the ID value. sptr is identical with a pointer ptr of the character string stored

in the entry of the dictionary 100 indicated by the ID. At step 405, character strings indicated by sptr and dptr are read from the data memory 104, and compare with each other. The number of characters over which a match has been found by the comparison is made a coincidence length. Upon completion of step 405, the process returns to step 402 to repeat steps 402-405 to Gillam's system in order to update or insert a character in a tree correctly.

13. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadashevich et al (or hereinafter "Kadashevich") (USP 5369577) in view uppala (US 6279007).

As to claim 18, Kadashevich teaches the claimed limitation:

"allocating a plurality of root nodes, one for each distinct element of said plurality of signatures" as each node A, E, I is represented by a different character of a stem found within the trie. A stem includes a word. A word contains one or more character. The applicant defined that a signature is represented as a character string. A character string comprises of one or more character. Thus, a stem is presented as signature; a character is presented as a substring of stem (col. 16, lines 45-58);

"determining a hash value for a signature of said plurality of signatures" as if the stem is abstract, a base index of 0, or 1 otherwise not based on a hash value (col. 44, lines 50-51);

"determining a status of a root node having said determined hash value" as if the current class represents the root suffix of an abstract stem, Get.sub.-- records calls

itself using the word found in the word field of the base.sub.-- index of the current history and a pointer to the children of the current class (step 1188). This information shows that the system determines a status of root node corresponding to word field of the base.sub—index. The word field is represented as value of index and not a hash value (col. 54, lines 5-10), "said root node being selected from said plurality of root nodes and representing a first element of said signature" as nodes 30 are presented as root nodes is represented by a character of stem found in the trie. In this case, a stem is presented as signature, a character is presented as a first element of stem (col. 16, lines 45-58);

"creating a branch for said root node if said root node has no existing branch" as a separate stem.sub.-- node is created for each of the CC.sub.-- nodes generated in step 525 and the current stem. This information implies when creating a stem.sub-node for each CC.sub-node, the system creates a new branch for each CC.sub-node. This information implies that each CC.sub-node has no existing branch (col. 34, lines 60-63), "said branch having one or more leaf nodes linked hierarchically to one another" as (col. 4, lines 64-68), "each successive leaf node representing a successive element of said signature" as nodes 30 are presented as root nodes is represented by a character of stem found in the trie. In this case, a stem is presented as signature, a character is presented as a first element of stem (col. 16, lines 45-58);

"e) creating a twig for said root node if said root node has an existing branch" as creating a stem.sub node for each of the CC.sub.—nodes (col. 34, lines 60-63) "said twig linked to one of said leaf nodes" as (col. 4, lines 65-68), "representing a substring

of said signature" as each node 30 is represented by a different character of a stem found within the trie. A stem is presented as signature; a character is presented as a substring of stem (col. 16, lines 45-58),

"the first element of said substring being represented by a twig node linked to said one of said leaf nodes" as as each node 30 is represented by a different character of a stem found within the trie. A stem is presented as signature; a character is presented as a substring of stem (col. 16, lines 45-58),

"repeating steps (b) through (e) for each signature of said plurality of signatures" as determining base index value for stem, representing a different character of a stem found within the trie for each node, creating a stem.sub-node for each CC.sub-node linking nodes in a tree as discussed above. The above information indicates that it is obvious to repeat this step for each stem of a plurality of stem. A stem is represented as a signature.

Kadashevich does not explicitly teach the claimed limitation "hash value". Uppala teaches each node of plurality of root nodes includes a hash value for each node character (figs. 6, 7A, col. 6, lines 35-51).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Uppala's teaching of each node of plurality of root nodes includes a hash value for each node character to Kadashevich's system in order to permit rapid insertion of new data into the data structure when new hierarchical values are stored in the data store and further to increase speed of searching nodes in a tree quickly.

As to claim 19, Kadashevich teaches the claimed limitations:

"determining a first element of said signature" as (col. 16, lines 45-55);

"determining an ASCII code for said first element" as sum of the values in ASCII code (mod a) of each character in the suffix (col. 21, lines 13-15).

As to claim 20, Kadashevich teaches the claimed limitation "the location of said one of said leaf nodes from which said twig diverges" as leaf nodes such as S 30, D 30 is located under node A 30 (fig. 16).

14. Claims 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillam in view of Hayashi (US 5841376).

As to claim 18, Gillam teaches the claimed limitation:

"allocating a plurality of root nodes, one for each distinct element of said plurality of signatures" as (figs. 1&2, col. 2, lines 10-15);

"determining a hash value for a signature of said plurality of signatures" as a word of a plurality of words. Each word is represented as a signature. Each word is not determined an index values (fig. 1, col. 2, lines 10-15).

"determining a status of a root node corresponding to said determined hash value" as the root contains a character indicates the status of this node is not empty. The status of the root node is not corresponding to a character not hash value (fig. 1, col. 2, lines 10-45);

"said root node being selected from said plurality of root nodes and representing a first element of said signature" as (col. 2, lines 10-45);

"creating a branch for said root node if said root node has no existing branch" as (figs. 1&2, col. 2, lines 10-45);

"e) creating a twig for said root node if said root node has an existing branch" as (figs. 1&2, col. 10-15);

"repeating steps (b) through (e) for each signature of said plurality of signatures" as (fig. 1);

"the first element of said substring being represented by a twig node linked to said one of said leaf nodes" as (figs. 1&2, col. 10-15).

Gillam does not teach the claimed limitation "hash value". Hayashi teaches assigning an index value as hash value to a character string (col. 4, lines 1-5).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Hayashi's teaching assigning a index value to a character string to Gillam's system in order to provide significant advantages in the speed of retrieval and further eliminate additional redundancy operations during searching/retrieving character in nodes on a tree.

As to claim 20, Gillam teaches the claimed limitation "the location of said one of said leaf nodes from which said twig diverges" as (figs.1&2, col. 2, lines 10-45).

15. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillam in view of Hayashi (US 5841376) and further in view of Kadashevich.

As to claim 19, Gillam teaches the claimed limitations:

"determining a first element of said signature" as (fig. 1). Gillam does not explicitly teaches the claimed limitation "determining an ASCII code for said first element". Kadashevich teaches sum of the values in ASCII code (mod a) of each character in the suffix (col. 21, lines 13-15).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Kadashevich's teaching of sum of the values in ASCII code (mod a) of each character in the suffix to Gillam's system in order to eliminate traversing a tree when searching characters on nodes.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Braun (US 6047238).

17 **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cam Y T. Truong whose telephone number is (571) 272-4042. The examiner can normally be reached on Monday to Firday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cam Y Truong
Primary Examiner
Art Unit 2162
3/28/2006